

PATENT APPLN. NO. 10/591,070  
RESPONSE UNDER 37 C.F.R. §1.111

PATENT  
NON-FINAL

REMARKS

*Claim Rejections - 35 USC § 101*

Claims 18 and 19 are rejected as being directed to non-statutory subject matter, i.e., an authentication "program."

Claims 18 and 19 have been amended to recite "A computer readable memory medium storing an authentication program."

Claims 18 and 19 as amended are believed to define statutory subject matter within the meaning of 35 U.S.C. § 101. Withdrawal of the 35 U.S.C. § 101 rejection is requested.

*Claim Rejections - 35 USC § 112*

Claims 6 and 13 are rejected under 35 U.S.C. § 112, second paragraph, as being definite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The rejection notes that the phrase "or the like" in these claims includes elements not actually disclosed.

Claims 6 and 13 have been amended to delete each occurrence of the phrase "or the like".

Claims 6 and 13 as amended are believed to be definite within the meaning of the requirements of the second paragraph of 35 U.S.C. § 112. Withdrawal of the 35 U.S.C. § 112, second paragraph, rejection is requested.

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*Claim Rejections - 35 USC § 102 and 35 USC § 103*

Claims 1-4, 8, 9-11 and 15-19 are rejected under 35 U.S.C. § 102(b) as being anticipated by Shi (EP 0957220).

Claims 5, 7, 12 and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shi (EP 0957220) in view of Shilton (WO 99/41834), and claims 6 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shi (EP 0957220) in view of Shilton (WO 99/41834), and further in view of Barker (US 5076971).

Claims 1 and 9 have been amended to include the limitations originally recited in claims 5 and 12, respectively. Claims 5, 7, 12 and 14 have been canceled.

Claim 1 has also been amended to recite the limitation "a means which outputs authentication data based on a pulse voltage or a pulse interval of the random pulses generated by the random pulse generator" and claim 9 has also been amended to recite the limitation "outputting authentication data based on a pulse voltage or a pulse interval of the random pulses generated by the random pulse generator". The limitation "... a pulse voltage or a pulse interval of ..." now recited in claims 1 and 9 is supported in the specification disclosure on page 13, line 20, to page 14, line 10.

Claims 1 and 9 as amended, and the claims dependent thereon, are believed to be patentable under 35 U.S.C. § 102 and 35 U.S.C.

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§ 103(a) over Shi and over the combinations of Shi and Shilton and Shi, Shilton and Barker.

Referring, first, to Shi, the present invention is clearly different from Shi with respect to how random pulses are generated.

In the present invention, a random pulse generator detects  $\alpha$  particles, a beta ray or a gamma ray released by the collapse of an atomic nucleus and generates random pulses.

Accordingly, the present invention can generate completely true random pulses.

As described in lines 5 to 10 on page 8 in the specification of the present application, the pulses generated by the random pulse generator of the present invention are not affected by environmental factors such as temperature, pressure, humidity or electromagnetic waves and, therefore, cannot be controlled artificially.

While Shi refers to "a true random code generator", Shi merely discloses (1) a traditional random pulse generator which obtains true random pulses by amplifying, limiting and sampling a kind of noise produced by an element such as an avalanche diode, and (2) a specified random number generator in which a pseudo-random code generator B is driven by an oscillator A, the output of the generator B is D/A converted and inputted to a voltage-controlled

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oscillator VCO to obtain a spectrum-spreaded signal, and the output signal of the oscillator VCO is sampled by another oscillator (see paragraphs [0015] to [0017] and Fig. 3).

However, pulses generated by these random pulse generators are affected by environmental factors such as temperature because each of the avalanche diode and the oscillator VCO has a temperature-dependent property.

Further, since an output of the oscillator B is a pseudo-random pulse signal, it cannot be changed into a completely true random pulse signal even if it is converted, amplified or processed in any way.

Accordingly, the present invention is clearly different in structure and operation (and advantage) from Shi. Therefore, Shi is insufficient to support a case of anticipation under 35 U.S.C. § 102 of claims 1-4, 8, 9-11 and 15-19 and withdrawal of this rejection is respectfully requested.

The combinations of Shi and Shilton and of Shi, Shilton and Barker are also insufficient to support the rejections under 35 U.S.C. § 103(a).

Shilton discloses a method for generating random pulse using  $\alpha$  particles but, however, discloses the following disadvantage in the method, as described on page 8, line 25 - page 9, line 3, of

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the specification.

"This method can be used to produce a stream of random numbers using a succession of single measurements in which a binary number '0' is output when the count is 0 and a binary number '1' is output when the count is >0. But it has the disadvantage that if the mean pulse rate is not exactly equal to  $\ln 2$ , the probability of outputting binary '1' is then not exactly equal to binary '0'. This causes a 'bias' in favour of slightly more binary '0's or binary '1's on average depending on whether the mean was lower or higher than  $\ln 2$  respectively. For a real radioactive device which is decaying, it is not always possible to fix the counting time so that the mean pulse rate always equals  $\ln 2$ , so there is likely to be some bias."

That is, the probabilities of outputting binary numbers '0' and '1' depend on the bias voltage, and the bias voltage is affected by the temperature. Therefore, the random numbers of Shilton are not complete true random numbers.

On the other hand, in the present invention, since the value of the random number is made by using the pulse interval, the value of the random number is merely changed, namely the changed value

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maintains the complete true randomness, even if the clock frequency (i.e. pulse interval) is changed according to the change of the voltage, as in the prior art.

Barker adds nothing to the teachings of Shilton.

For the above reasons, the proposed modification of Shi, with or without Barker, will not result in the authentication apparatus or authentication method defined by the claims of the present application. Withdrawal of the 35 U.S.C. § 103(a) grounds of rejection is also requested.

A notice of allowability of the present application is believed to be in order and is respectfully solicited.

The foregoing is believed to be a complete and proper response to the Office Action dated August 21, 2009, and is believed to place this application in condition for allowance. If, however, minor issues remain that can be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number indicated below.

In the event that this paper is not considered to be timely filed, applicant hereby petitions for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

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In the event any additional fees are required, please also  
charge our Deposit Account No. 111833.

Respectfully submitted,  
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